

T. H. Paul and J.A. Millholland,
Master Locomotive Builders
of Western Maryland

Patrick H. Stakem

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Third edition

4th in Trains Series

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Introduction

This book describes two men whose careers intersected at the Mount Savage Locomotive Works in Western Maryland. T.H. Paul was Master Mechanic of the Works but left to form his own business based in Frostburg. He focused on narrow gauge locomotives. His break with the Cumberland & Pennsylvania Railroad, owner of the Mount Savage Shops, was amicable. He sent business to Mount Savage, and they sent him business concerning narrow gauge and mining equipment, which they did not manufacture. It was a win-win. When the Mount Savage Locomotive Works Catalog came out in 1883, Paul's engines were featured prominently.

James A. Millholland had come to Mount Savage with his father, also James Millholland, in 1866. He worked at the Mount Savage Locomotive Works and the Cumberland & Pennsylvania Railroad, then for the Georges Creek & Cumberland Railroad.

Both Paul & Millholland became Master Mechanics of the Cumberland & Pennsylvania Railroad. And, both men contributed to the state-of-the-art in 19th century railroads, and both had patents granted to them.

The author

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All photos from the author's collection, unless otherwise noted.

T. H. Paul

The Mount Savage Shops of the Cumberland & Pennsylvania (C&P) Railroad produced approximately one hundred locomotives between 1868 and 1917. At the same time, a smaller locomotive manufacturer flourished just up the line in Frostburg.

The Thomas H. Paul and Son Iron Works Company had its facilities at the bottom of Depot Street, across from the C & P Depot in Frostburg. His residence was located nearby. The site was occupied by buildings of the Maryland Coal & Realty Company. The facility was purchased by Consolidation Coal in 1900, and by the Jenkins family in 1947. The Paul works were originally located in 1855 where the Presbyterian Church now stands on Broadway. The move to Depot Street occurred in 1867. Production continued until 1883, when Paul left to build a locomotive facility in Baltimore. This effort was not successful, and he returned to Frostburg, although not to continue his work. He later moved to Sioux City, Iowa, in 1890. His son died in Frostburg in 1903.

Paul's credentials were well suited to his chosen profession. He learned the machinery trade from his father, who was a millwright and engine builder with a shop in Patterson, NJ. Paul's father was born and married in Scotland, and emigrated to the United States in 1818. Paul was born in New York on March 10, 1820. He was apprenticed in his father's shop, and later, at the age of 15, to the Rogers Locomotive Works in Patterson, NJ. He was there in 1837 when the works completed its first locomotive. He served for seven months as engineer on the Patterson & Hudson Railroad, the youngest engineer in charge of a locomotive. Paul then worked at his father's locomotive works in Baltimore for ten years as general manager. His father had purchased the facilities from William Winans, son of Ross Winans, a noted locomotive designer and builder. Paul journeyed to Paraguay in 1850, returning to Baltimore by way of England. By 1854, he was Master Mechanic for the Cumberland & Pennsylvania in Mount Savage. In that year he also married Marian Neff of Kuntztown, PA. They had two children, John Thomas Haig Paul, and Ella Marian Paul (later, Hitchens).

In 1855, he opened the T. H. Paul & Son Iron Works in Frostburg to capitalize on the need for mining cars and machinery in the nearby coal mines. Paul may have built the first narrow gauge steam locomotive in the United States. The Mt. Savage Railroad had reached Frostburg some three years earlier. He expanded his business to produce narrow gauge mine locomotives and stationary boilers. He is listed in the Census of 1860 as having \$5,000' of property. In the 1870 Census, this has increased to \$16,000 in real estate, and \$7,000 in property.

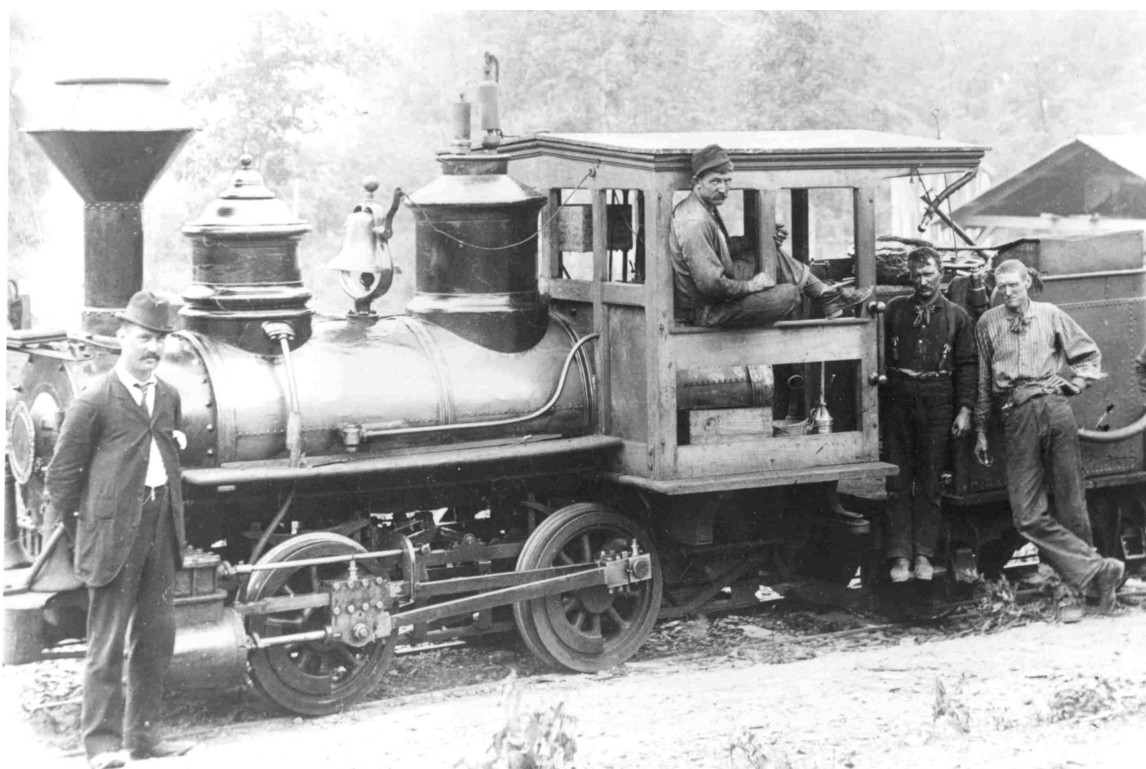
The real property was on Main Street, and consisted of store fronts with a stage upstairs for performances. This structure burned in Feb. 1874. It was insured, and thus rebuilt. In 1876, Paul's Opera house opened in Frostburg. The building still stands, and is called the Lyric. Paul was in business with his brother R.C. Paul from 1855 through 1863. In 1871, his works completed an 8-ton narrow gauge engine for the Franklin Coal Company of Connellsville, PA.

By 1872, R.C. Paul advertised independently as a founder and machinist, with shops on the south side of the C&P tunnel. A member of the Lutheran Church, he cast bronze and brass, and was the inventor of a type of heating radiator used in churches. The 1893 Frostburg City Directory lists Thomas H. Paul & Son as having a facility at the foot of Mill Street. Paul's Foundry in Frostburg was extensively damaged by a cyclone in 1890. The Frostburg Mining Journal of March 15, 1883 mentions a 4-horsepower gasoline engine he built.

T. H. Paul was producing larger road engines for the railroads, using his old employer, the C&P shops, under subcontract. He sent his drawings and patterns to Mt. Savage to get the parts made. The C&P shops were doing \$10,000 a month worth of work for Paul in the period 1881 through July of 1884. His son Thomas was general manager. An extension shop in Cumberland was considered in 1882. Around 1882-1883, T.H. Paul bought buildings in Baltimore. The Company moved there in 1883. There were financial problems resulting from the Depression of 1882-85. Paul owed the Betts Machine company some \$5,000 and couldn't pay. A lawsuit was filed. The foundry in Frostburg was sold by the Sheriff in 1884. The Cumberland Civilian newspaper of Aug. 19, 1883, mentions a receivership.

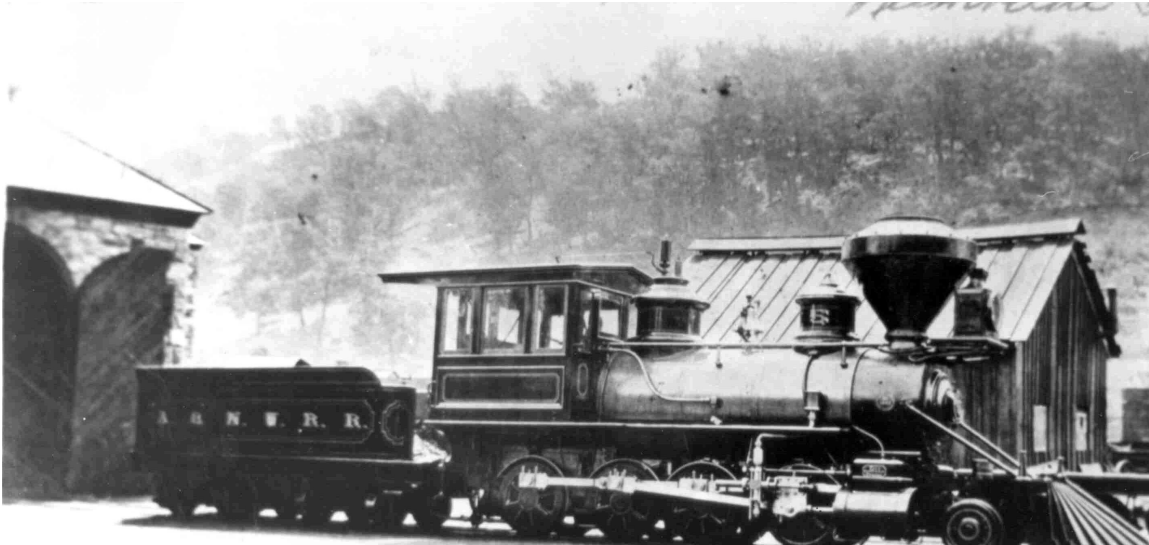
The period beginning 1883 was actually a busy one for heavy manufacturing in Mt. Savage. A locomotive catalog was issued for the Works by their agent, Thomas B. Inness & Co. of Broadway, New York. The catalog listed five types of engines for sale. Numerous sales resulted. Narrow gauge engines proved so popular a product that the works installed a third rail up the main line from Mt. Savage for customer acceptance testing. The narrow gauge equipment, 4 of the 5 types listed in the catalog, was all of the Paul pattern. It is unclear if the relationship between Paul and Mt. Savage deteriorated. In any case, the Mt. Savage Shops shipped quite a few narrow gauge engines of the Paul pattern. Up to that point, Mt. Savage had only built standard gauge units.

All units were built at Mount Savage for Paul under contract, and all were 3' gauge. Two units went to the Green Ridge Railroad (GRRR) of eastern Allegany County, Md. Number 1 is featured in an illustration in the Mt. Savage catalog as the model for the 0-6-0 units. GRRR Number 2 is an 0-4-0 unit. The rail line was eight miles to the east of Cumberland, in the vicinity of Town Hill and Fifteen Mile Creek. It belonged to the Merten family, and supplied timber to a sawmill at Oldtown. The lumber was used by the Merten's boatyards in Cumberland to construct canal boats. The railroad operated from 1889 to 1897. It interchanged with the B&O railroad near Paw Paw, WV, after crossing the Potomac on a trestle bridge. Disposition of the engines is unknown.



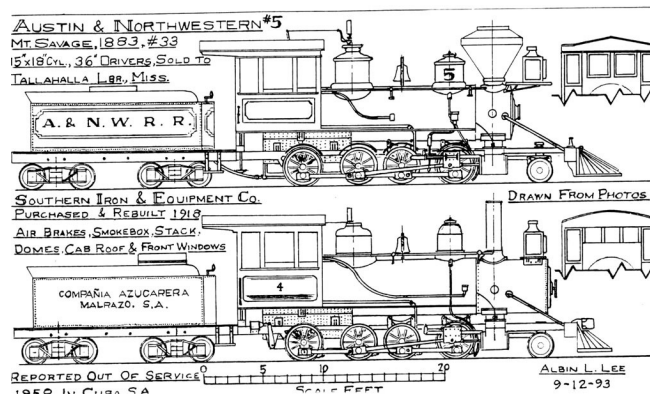
Three engines went to the Pacific Coast Railroad, Oregon Improvement Company. Three more went to the Toledo, Delphos & Burlington in Ohio as their numbers 39, 40 and 47. The Pittsburgh & Western (P&W) got two units. A 2-6-0 unit built in March 1882 was sold in April 1884 to the Bright Hope Railway as their number 3. In 1883, the Bright Hope narrow-gauge railroad terminal was constructed at Bermuda Hundred, Virginia. The Bright Hope, also known as the Tidewater and Western, carried lumber, coal and flour from the Piedmont to be loaded on schooners and freighters for ports throughout the world. Another 2-6-0 unit was built as P&W No. 4 in April 1882, and was later sold in November 1887 to the Grafton & Greenbrier railroad. The Pittsburgh & Western was absorbed into the B&O system in 1902. The engines were listed on their roster for that time.

The Austin & North Western Railroad was a narrow gauge line that wandered north and west from Austin, Texas. Our interest in this Texas narrow gauge shortline is that they had 5 engines, all from T.H. Paul. He built the first four at his shops, and had Mt. Savage build the fifth one. The 5th engine had 3-foot gauge, 15" x 18" cylinders, and weighed 28 tons. A picture of that engine, outside the shops at Mt. Savage, shows the third rail. There was narrow gauge as well as standard gauge track from Mt. Savage to Borden.



The A&NM number 1 was named J. A. Rhomburg, Number 2 was H. W. McNeil, number 3 was J. K. Grones.

The most important job of the Austin & North Western was to haul 50,000 tons of pink granite from quarries to build the new Texas state house at Austin. Doubtless, Number 5, the big engine, did the bulk of the work. This engine was listed as Mt. Savage serial #33 by the Southern Iron & Equipment (SI&E) Company, a broker, in 1918. It went to the Tallahalla Lumber Co. in Mississippi, and worked on that line for some years. It then came back to SI&E, and was listed as #1264. The engine was then sold to the Madrozo Sugar Company (Compania Amuracera Madrozo S.A.) of Cuba as their #4 on 26 August 1918. It was reported retired in 1958. A drawing, courtesy of Mr. Albin Lee, of Austin, Texas, shows the engine as it came to the Austin & North Western, and as it was in service in Cuba.



In February 1882, Paul shipped a 22-ton passenger locomotive to Ohio, then in March he shipped a 20-ton unit, built at Mt. Savage, to Texas. This was followed by a 10-ton tank engine to Pennsylvania, and a 22-ton Mogul (2-6-0) to the Pittsburg & Western. Fifteen locomotives were shipped by Paul between 1880 and 1883. He is reported to have done "a very extensive business in Cuba." The Rehor letter (see references) lists nine engines built at Mt. Savage for resale by Paul. At the time of the Civil War, an average locomotive cost between \$8,000 and \$10,000, and prices remained stable for many years. There was a 2-6-0 Paul locomotive in Texas, cylinders 14" x 18", owned by the Kirby Lumber company, not the original owner. The Anniston & Atlantic line in Alabama had a Paul engine. Also in Alabama, Mr. H. T. Simms had a 4-4-0 narrow gauge unit bought third-hand for his logging railroad. In 1892, Mount Savage outshopped the S. C. Dorsey, a narrow gauge 4-4-0.

The Peach Bottom Railroad of Lancaster County, Pennsylvania, purchased a Mount Savage locomotive second-hand from the West Virginia & Pittsburgh. The Peach Bottom was a narrow gauge predecessor to the Maryland & Pennsylvania. This engine is mentioned in "The Ma & Pa: A History of the Maryland & Pennsylvania Railroad," by George Hilton. The Peach Bottom was supposed to connect with the East Broad Top around 1878, but never did.

Mount Savage Locomotive outshopped number 36 in 1883 for the West Virginia narrow gauge line the Clarksburg, Weston, & Glenville. The line was later acquired by the West Virginia & Pittsburgh Railroad and converted to standard gauge.

In July 1885, Ulysses S. Grant traveled from New York City in Mr. Pullman's personal railcar, up along the Hudson River, through Poughkeepsie and Albany, to Saratoga Springs. He then took the narrow gauge Saratoga, Lake George, & Mt. McGregor Railroad to the resort at the mountain top. President Grant died in Drexel Cottage on Mt. McGregor shortly later. His body was brought back down the mountain by train. The 3-foot gauge railroad, opened in July of 1882, had three locomotives. There is a good possibility, although not confirmed, that these were from T.H. Paul. Unfortunately, T. H. Paul did not affix builders plates to his locomotives.

Another interesting story concerns the sale of two locomotives to the Farmville & Powhattern Railroad in Virginia, near the James River. It was chartered in 1884, and hauled mostly coal, and some tobacco. Its rails and equipment were sold to the Government of France during World War-I. The line was dismantled and made ready for shipment in June of 1918. The rails made it, but it is unclear whether any of the locomotives did. Engine number 4 and 7 were 2-6-0 units. Number 7 went to broker S, I & E as #1027, and was sold to F. C. Norte Occidental in Cuba.

At its peak in 1881, the Paul works employed 60 men. The foundry building measured 33 feet by 70 feet, and numerous machinery, storage, and engine houses were adjacent. A branch foundry was located at Cumberland, at the corner of Davidson and Front Streets. That would have been near the Lena furnace. The facility used local coal and firebrick, and may have used pig iron from the Bowery Furnace. This furnace, located in

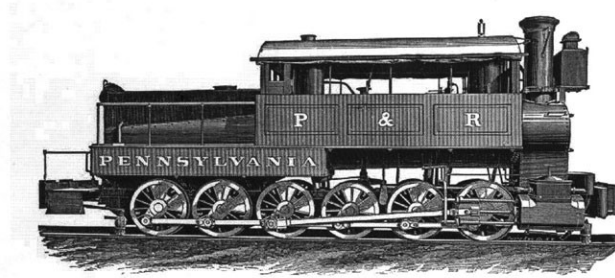
Midlothian and operated by the Cumberland Coal & Iron Company, was producing 140 tons per week in 1871. By 1880, the good ore was nearly depleted, and the furnace shut down. Plentiful iron was available by rail from Pittsburgh. After he lost the Baltimore property, Paul returned to Frostburg, where he experimented with gas engines. Hilton (see Refs) gives Paul's yearly production of locomotives as: 1880 – 1, 1881 – 4, 1882 – 10, 1883 – 8, for a total of 23.

The pattern room of the foundry was located above the machine shop. Here, wooden forms were built to allow the rough casting of parts. In the casting department, molten metal was poured into sand molds made around the patterns. The cooled rough castings were finished in the machine shop. Here, lathes, planners, mills, and drills were driven by leather belts from an overhead main shaft, powered by a stationary steam engine. In the adjoining boiler room, steam punches, hammers, and rolls would be used to shape and form iron plate. The blacksmith's shop, next to the boiler room, made and repaired tools. Wooden frame and coachwork, and boiler lagging would have been done on site, or parceled out to local artisans. The shops probably produced almost all of the locomotive from raw materials.

Shops like Paul's were the backbone of the industrial revolution, and the center of innovation in the age of steam. His shops, like the iron furnace facility at Lonaconing and the industrial center at Mt. Savage, provided and depended upon the transportation infrastructure that was essential in the emerging world power that was the United States. Paul traveled to Trinidad, Colorado, in June 1889. He was considering moving his facilities there. He chose, however, to establish a branch foundry in Sioux City, Iowa, in 1889. The Maryland properties and residence were sold in 1898. His wife died in Frostburg in 1890.

James A. Millholland

James Millholland, Senior was 54 years old when he and his family came to Mt. Savage from Reading, PA. Millholland was a master mechanic and an "advocate of plain engines and simplicity." He had extensive experience in keeping Winans camel engines running from his earlier work in Pennsylvania with the Baltimore & Susquehanna and he was credited with many important locomotive innovations. He came in 1866 as the President of Consolidation Coal, and of the Cumberland & Pennsylvania Railroad. He resigned in 1869 to enter the banking business. He was credited with developing the first anthracite burning locomotive, and was Superintendent of Motive Power and Rolling Equipment for the Reading for many years. He is also credited with constructing the first iron deck girder bridge in the U.S. for the Baltimore & Susquehanna near Bolton in the period 1846-47. He was responsible for so many improvements to the basic Winans camel engine, the class was referred to as "Millholland Camel's". He is credited with designing a 12-wheeled camel engine, built in the Pennsylvania & Reading shops in 1863. He registered a series of patents from 1843 to 1870.



PENNSYLVANIA

THE first engine to be built with six pairs of driving wheels was the Pennsylvania, designed by James Millholland and completed at the Philadelphia & Reading Shops in 1863. It was intended and used for pusher service, particularly in handling coal trains over the summit of the hills between the Schuylkill and Delaware Rivers.

Though originally both fuel and water were carried on the engine, when it was rebuilt in 1870, with the rear pair of drivers omitted, a separate tender was attached. The principal reason for its being modified was because it had difficulty in negotiating curves, some of which were as short as 320-foot radius. It was so powerful that it was destructive to the light cars then used for handling coal.

Cylinders 20 by 26 inches Weight 100,300 pounds Driving wheels 43 inches in diameter Wheelbase 19 feet 7 inches

Millholland, Senior, had apprenticed at the Shops of George W. Johnson in Baltimore when the Tom Thumb locomotive was being assembled for Peter Cooper, of New York. (1829). This was the first locomotive built in America, so James Senior was there from the beginning. He was described as “an exceedingly bright boy with a natural aptitude for machinery, and a head on his shoulders older than his years...” In 1830, we find them remodeling the Cooper Locomotive, and Johnson and Millholland decide to build their own unit, without infringing on anyone's patents.

In 1830, for the B&O, they built a 4-wheel locomotive with 2 vertical cylinders, and a horizontal boiler. It was named the Johnson. There was an announcement made by the B&O in the Baltimore American, on Jan 5, 1831, that the Company wanted a locomotive of American manufacture and would pay \$4000. and \$3500 for the runner-up. The Specifications were no more than 3.5 tons, draw 15 tons on level at 15 mph. B&O would supply Winans cars, friction of 5 lbs to the ton. Flanges were to be on inside of the rails; 100 psi steam or less; 2 safety valves; steam gauge for >50 lbs, and safety at 100 lbs. It was to be tested for 30 days work on the road, with the Company to supply water and fuel. The Company would also supply wheels.

Johnson was the first to enter the contest. The winner was the locomotive York, by Phineas Davis. Johnson and Millholland went back to their shop for more tinkering.

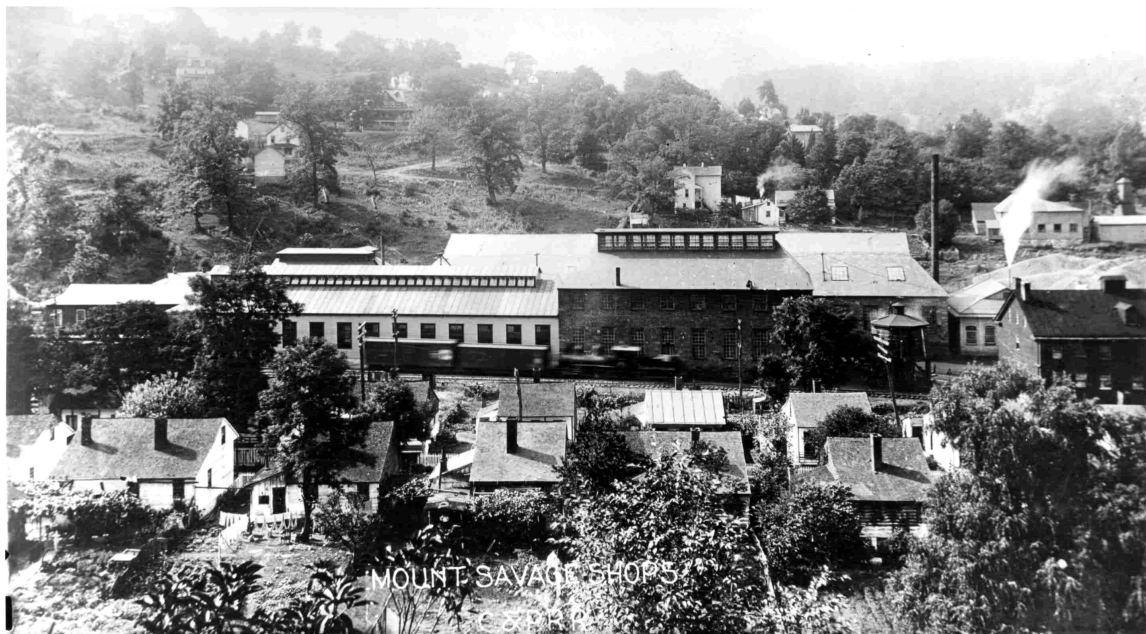
In 1835, Millholland got together with James Allaire of the Allaire Iron Works in New York. This firm was a manufacturer of marine steam engines. Indeed, they manufactured 50% of the early U.S. steamships, and produced the cylinder for the first steamship to cross the Atlantic. In 1850, the firm was taken over by Vanderbilt. The relationship between Millholland and Allaire must have been cordial, as Millholland named his son James Allaire.

In 1851, Millholland's Illinois on the Reading burned anthracite successfully. It had 2 pairs of 7-foot driving wheel. It was reported to have gone 75 mph. It was built in the Reading shops, with 17” cylinders, and a 30 inch stroke. It weighed 31 tons. He then built for the

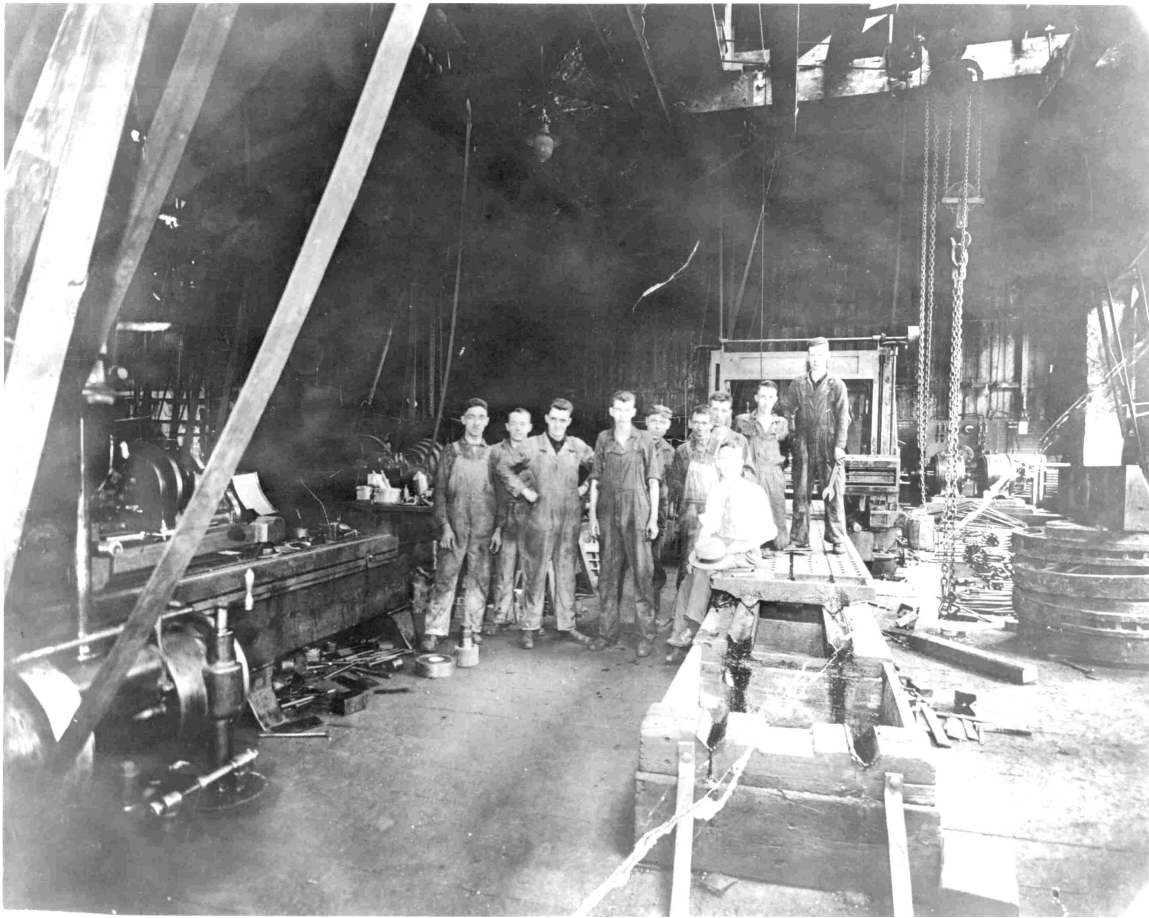
Philadelphia & Reading a unique double flue engine, which had 2 sections divided by a combustion chamber.

His next big effort, in 1857, was a 12-wheeled loco, the Pennsylvania for the Reading. It had 20" x 26" cylinders and a wheelbase of 19' 7". There was no tender for coal, since it just ran just short helper stints for loaded coal trains of 1.5 miles of 1/155 grade. It weighed 50 tons. The boiler was four feet in diameter, with 174 iron water tubes. It had three water tanks carrying 1,225 gallons.

His son was 24, when the family moved to Mt. Savage. He had been born in Reading in 1842, and had apprenticed in the railroad shops. He also joined the Cumberland & Pennsylvania, becoming Master Mechanic, and was vice-president by the time his father retired. He left the C&P in 1879 to join the upstart Georges Creek & Cumberland Railroad. The younger Millholland was tasked with building the C&P shops, to maintain the mixed fleet of motive power. He had the right experience for the job.

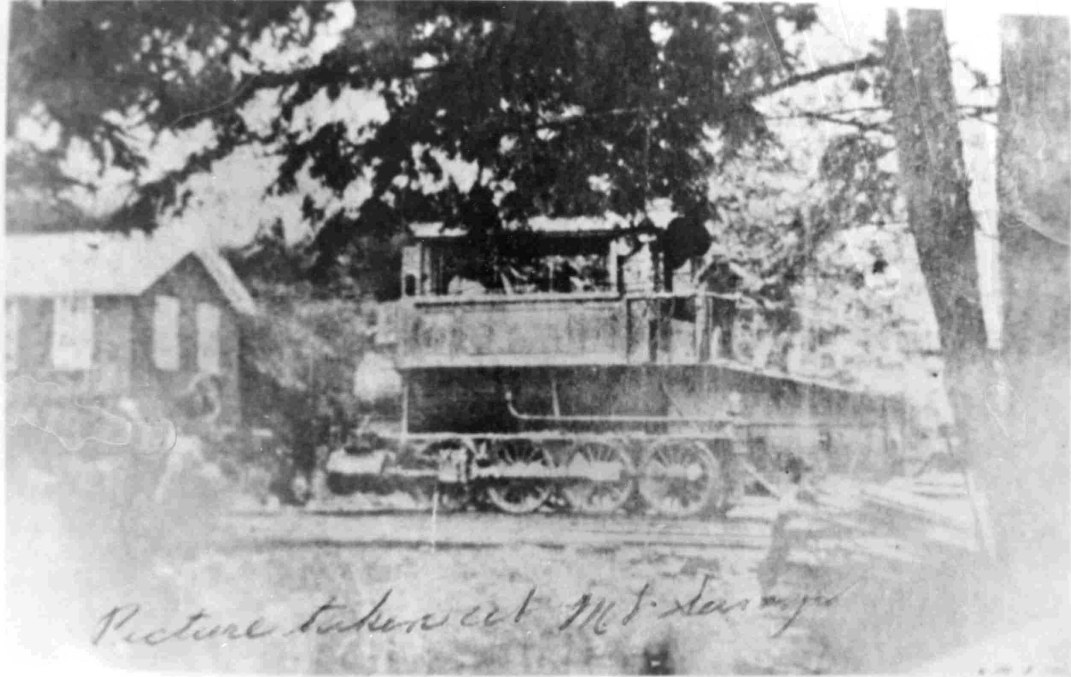


Millholland bought good machine tools, which were still in use 40 years later as evidenced by the 1917 ICC valuation. He equipped the shops with metal working machinery from Bement & Dougherty, probably a predecessor of Wm. B. Bement & Son of Philadelphia.



Initially, the work supervised by Millholland at the Mt. Savage Shops was limited to repairing and rebuilding the Winans Camels and other early C&P locomotives. The shop force gained much hands-on experience during the first twenty years; at least 15 of the C&P's camel-backed locos were rebuilt at Mt. Savage (some twice). Typical of the rebuilds was the engine Highlander, a Winans Camel inherited from the Mt. Savage Rail Road. It was a modernization project in which, among other things, the cab was relocated from on top of the boiler to the rear position. The C&P shops also provided repair services to its rivals in the Georges Creek coal region. Anything for a dollar.

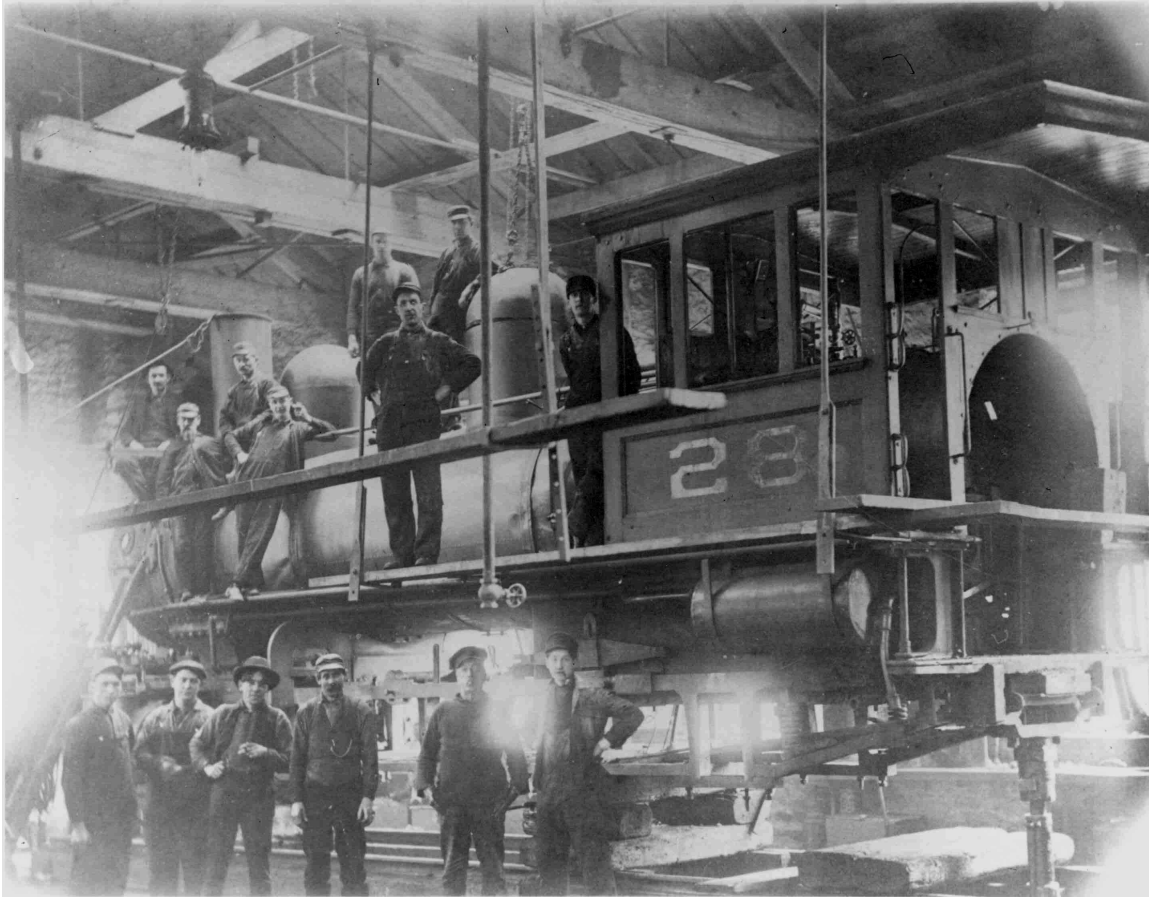
*Eng built By Rose Hill and 1853 made of eng. W. H. Millholland
Remembered to #12 in 1870, scrapped in 1894*



Picture taken at Mt. Savage

By the 1880's, Millholland apparently had built quite an extensive operation, able to offer custom built locomotives for sale in addition to meeting the requirements of the parent C&P.

James A. left the Cumberland & Pennsylvania in 1869 for the new start-up, the Georges Creek and Cumberland Railway. He served as President of the line. He died in 1911. He had twelve children by his first wife Mary Ann Hoff, and four children by his second wife, Woodward H. Blunt. One of his sons, Henry, was a gifted mechanical engineer, who worked for the Pennsylvania Railroad and the Baldwin Locomotive Works. He was involved with the early manufacture of bicycles, and the Duryea motor car. Another son, Paul, was a Civil engineer, involved with the survey and construction of the West Virginia Central and Pittsburgh Railway. James and his wife Virginia and a lot of his children are buried in Rose Hill Cemetery, Cumberland, Maryland. Some of his descendents still live in Cumberland.



The Georges Creek & Cumberland Railroad

The Georges Creek & Cumberland (GC&C) Railroad was the child of two mining companies, the Maryland Coal Company, and the American Coal Company.

The Maryland Coal Company was formed in 1870, as a result of as Maryland Legislature action to change the name of the Mutual Coal company, chartered in 1868. An Act of the Legislature in 1878 enlarged the powers granted to the company to engage in the transportation business as well. The American Coal Company was chartered in 1852, and similarly had its charter amended in 1878 to allow it to engage in the railroad business. They were authorized to construct a railroad from their mines to the C&O Canal, or the B&O Railroad.

The Maryland Coal company had mines on the west rise of the Big Vein, near Lonaconing. Their Kingsland mine operated with 104 men in 1907, delivering 900 tons per day. It used a 42-inch gauge, 2,00 foot long tram road from the mine to a tippie on the GC&C. Their Appleton miner used the same tippie. The tippie loaded coal into the coal hoppers, and had a facility for loading the locomotive tender as well. The tram road operated with a 10-ton locomotive.

Maryland Coal also operated the Tyson and New Detmold mines with 52 men producing 1000 tons per day in 1907. Here, they utilized a fireless haulage locomotive, which was charged with steam at a central plant near the mine mouth. The 42-inch mine track was operated with 1,600 pound mine cars that had a 5,000 pound capacity.

American Coal Company's Jackson Mine at Pekin, and Caledonia Mine at Barton, worked the Big Vein. From the mine mouth, a 22-ton locomotive transported the coal cars over a one mile long tram road to a tipple on the GC&C line.

In the Georges Creek Coal Region of Allegany County in the 1870's, the transportation monopoly was controlled by the Cumberland & Pennsylvania (C&P) Railroad, which was owned by the Consolidation Coal Company. Rival companies could not get competitive rates to move their coal from the mines to the B&O and the canal. The solution was seen as two-fold: build a second railroad, and involve the B&O's rival, the Pennsylvania Railroad. The GC&C should not be confused with the earlier Georges Creek Rail Road, built in 1853 to allow shipment of iron products from the furnace at Lonaconing to the planned canal and railroad terminus at Westernport.

The GC&C was born out of controversy and competition with the C&P, and this climate of anti-cooperation continued. The GC&C had to fight its way past the C&P into Cumberland, and then fight for the right to reach the canal over B&O trackage. The first fight was at the west end of Cumberland, an area known as City Junction. The GC&C had to cross the C&P's Potomac Wharf Branch, which was there first. The Pennsylvania Railroad in Maryland line had been built from the Pennsylvania state line to the west side of the Narrows. It was their intent to continue down the north side of the Narrows, along with the C&P and B&O mains, to Cumberland. The C&P persuaded the other road to bridge Will's Creek, and continue down the south side of the Narrows, then cross the C&P's Potomac Wharf Branch at City Junction. When the line was built to City Junction, the C&P changed its mind. It kept an engine parked at the intended crossing point, blocking construction. When the engine was a bit late getting back into position one day, the GC&C trackmen forced the crossing. The C&P trackmen tore it out. Tempers flared. The C&P raised its trackbed, making crossing impossible. The final issues were decided in court, in favor of allowing the GC&C crossing with due compensation. Then, the B&O did not want to grant the GC&C trackage rights to reach the canal terminus, and that issue also had to be resolved in court.

Besides the C&P and the trolley, the residents of the Georges Creek could opt for the Georges Creek and Cumberland Railroad passenger service. The depot was on Scotch Hill.

GC&C passenger stations were located at Cumberland, Vale Summit, Midland, and Lonaconing. The station at Lonaconing was located up the hill behind the iron furnace, and was reportedly inconvenient to reach. The right of way of the line is still evident in this area, but no rails remain. The GC&C used the Hay Street Station in Cumberland, and made a passenger stop at Mechanic Street.

The GC&C rostered a 4-6-0 passenger engine. The GC&C had several passenger cars, including an observation car with open sides. This car was popular for political outings and picnic excursions, but not in the winter.



The January 18, 1887 published schedule shows two trains per day from Cumberland to Lonaconing (except Sundays). If you took the 10:45 AM from Lonaconing, you could lunch in Cumberland before catching the 1:15 PM to New York over the Pennsylvania Railroad. This express service would arrive in New York at 7:10 AM the next day. There was checked baggage service on this line.

AND
SHORT LINE PASSENGER TRAINS,
DAILY, Sundays excepted.
 From HAYS STREET STATION, Cumberland.

OUTWARD-BOUND G. C. & C. R. R. TRAINS

Leave Cumberland....7:15 a. m.; 1:30 p. m

Arrive Vale Summit..8:00 a. m.; 2:15 p. m

Arrive Lonaconing....8:30 a. m.; 2:45 p. m

Pennsylvania Railroad trains leave at 8:20 a. m. and 1:15 p. m., for Bedford, Pittsburgh, Philadelphia and New York.

RETURNING G. C. & C. R. R. TRAINS.

Leave Lonaconing...10:45 a. m.; 5:00 p. m

Arrive Vale Summit.11:15 a. m.; 5:30 p. m

Arrive Cumberland..12:00 noon; 6:15 p. m

Pennsylvania Railroad trains from Bedford, Pittsburgh, Philadelphia and New York arrive at 12:15 and 9:05 p. m.

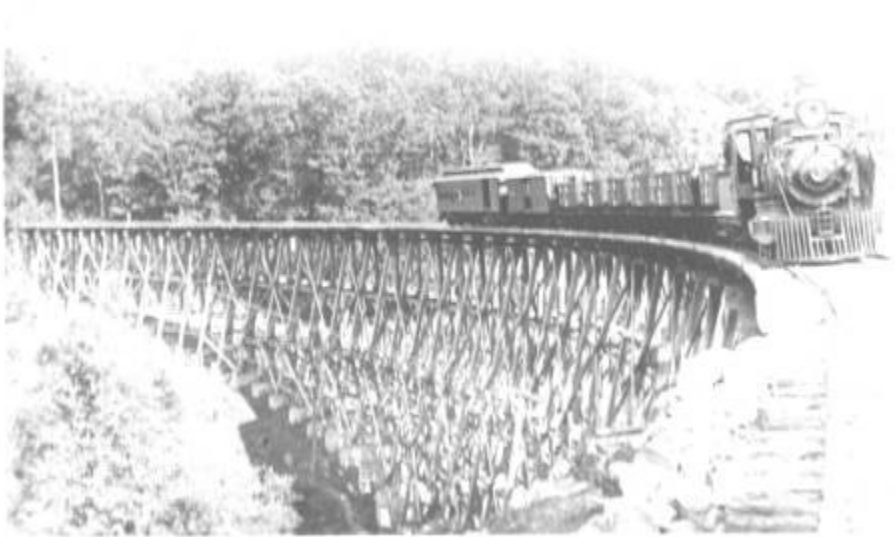
JAMES A. MILLHOLLAND,
 General Manager.

• JANUARY 18, 1887. •

The GC&C motive power all came from the Pittsburgh Locomotive and Car Works. Ten engines were rostered. There were nine engines of the 2-8-0 wheel arrangement, and a 4-6-0 passenger engine. All of the engines went to the Western Maryland, and all were reported scrapped between 1914 and 1917. For rolling stock, the GC&C rostered predominately coal hoppers; two hundred being listed for the year 1884. In addition, the 1884 Poor's lists two box cars, and 10 platform cars. The various ICC valuations list 24 GC&C cabooses for 1911 and 1912, and 20 for the year 1913. The GC&C also had several passenger cars, including an open-sided observation car.



The GC&C was big on trestles. During construction of the line, a single contract for 1.5 million feet of pine trestling lumber was let. Bridge 42 was the Winchester Road Viaduct, which crossed just south of the C&P Bridge. Uphill of the line's two tunnels was Bridge 50, the Percy Hollow Trestle. Past Clarysville was Needham's Viaduct, also called Bridge 81. Clises Run Viaduct, Bridge 115, at Cabin Run was a major structure. This was of wooden construction first, then later replaced with a steel structure. The stone abutments still exist.



Bridge 137, the Midland viaduct, bisected the town. The stone abutment for the northern end can still be seen between Routes 936 and 55, at the northern end of the town.



Beyond Midland, there was a bridge over Douglas Run, the stone ends of which can also still be seen. A turntable was located at Midland Junction. Bridges were necessary at Mile post 16 and 17 to cross and recross Georges Creek, the road, and the line of the Cumberland and Westernport Electric railway. Bridge 06 crossed the Pine Hill Plane. Bridge 20, the Jackson Wye viaduct, was located on the Jackson Branch, near milepost 19. A trestle was necessary over Castle Run at milepost 20, on the branch to the Koontz mine.

The Western Maryland Railroad purchased the controlling stock interests of the GC&C on January 17, 1907. The GC&C was a small but key part of the Gould master plan for a transcontinental railroad link. The financial panic of 1907 put an end to these grand schemes. Bankruptcy followed. Operation of the GC&C was taken over by the newly reorganized Western Maryland Railway in July of 1913. A full merger and consolidation took place on January 23, 1917. The line was operated until 1939, when the Western Maryland abandoned the track from Georges Creek Junction to Midland. Mines west of Midland were then served through an interchange with the C&P at Jackson Junction, north of Lonaconing.



The GC&C started as two separate pieces, the line to Vale Summit and Lonaconing called the GC&C, and the connection to Pennsylvania, called the *Pennsylvania Railroad in Maryland*. These were merged under the name Georges Creek and Cumberland. Later, the Connellsville Extension of the Western Maryland Railroad was built under the umbrella of the GC&C. On July 1, 1913, the GC&C was formally absorbed into the Western Maryland system, and the Connellsville extension became WM trackage, as did the Pennsylvania Railroad in Maryland. This ended the hope of extending the original Georges Creek & Cumberland line.

So, two important innovators of the early development and deployment of locomotives in the United States converged at Mount Savage, the 19th Century technology center that developed the first iron rails in the United States. Their contributions were significant, and their legacy is lasting.

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Images of T. H. Paul and J. A. Millholland's Patents

In addition to the patents listed for Paul, he had been granted number 330,261 in November of 1885, for a Planer-chuck for locomotive links, and number 463,282 in 1891 for a “Gas Stove and Radiator.”

Note patent 530,237 is joint with his son John.

UNITED STATES PATENT OFFICE.

THOMAS H. PAUL, OF FROSTBURG, MARYLAND.

APPARATUS FOR MAKING ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 470,629, dated March 8, 1892.

Application filed April 13, 1891. Serial No. 388,737. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. PAUL, a citizen of the United States of America, residing at Frostburg, in the county of Allegany and State of Maryland, have invented certain new and useful improvements in Apparatus for Manufacturing Illuminating and Heating Gas, of which the following is a specification, reference being had therein to the accompanying
10 drawings.

My invention relates to certain improvements in apparatus for manufacturing illuminating and heating gas; and it has for its object, among other things, to produce in an effective and expeditious manner a pure rich
15 gas; and it consists in the novel combination and arrangement of parts, as will appear from the following description and claims, reference being had to the drawings.

In the accompanying drawings, Figure 1 represents a side elevation, partly in section, of my improved gas apparatus. Fig. 2 is a plan view thereof with the top of the furnace removed exposing the converter, this view
20 also showing the air-compressor, condenser, and washer.

In the embodiment of my invention I employ a series of hydrocarbon tanks or carburetors A, having connected with their lower ends by a series of valved branch pipes *a* an oil or hydrocarbon feeding pipe *a'*, connected to the supply-tank. (Not shown.) The valves *l* in the branch pipes provide for regulating the supply of crude oil, which is the
30 form of hydrocarbon I employ, to the respective tanks or carburetors and maintaining it at a proper level therein. The tanks or carburetors A have connected to the tops thereof a series of pipes D D'. These pipes,
40 as clearly shown in the drawings, are of substantially reversed-U shape and are arranged at opposite ends of the tanks, one leg of each section or series connecting at its lower end with the adjacent tank or carburetor of each pair. At the lower end of the section or
45 length of the series of pipes D', down which the air or carbureted air passes, as will presently appear, is a perforated plate 2, which carries a series of depending pipes or tubes
50 D², which register with the perforations in said plate and extend down to near the bottom of the tank or carburetor below and into the oil therein. By this construction the heated air in its passage through the appa-

ratus passes downwardly through the pipes D' and D² into and through the crude oil or from end to end of each tank, and then up through the pipes D before passing out of the pipes to the converter, whereby I am enabled to effect the thorough and intimate union of the hydrocarbon and air and the consequent production of a highly-charged carbureted air or gas. The pipes D D' are supplied or charged with charcoal, coke, or other known substance to effect the removal of impurities from the carbureted air or gas in its upward and downward passage therethrough, and also to effect the intimate commingling of the air and the hydrocarbon vapor.

B is the converter, and B^a the enricher. These are arranged in the furnace C, and consist of a series of rectangular pipe-coils, which traverse the entire width of the furnace and are arranged two or more layers deep, the lower tier, which is maintained at a red heat, preferably comprising the greater number of coils of pipe constituting the "gas-fixer," thus providing the maximum heating surface or capacity for the gas in its passage therethrough to effect the thorough "fixing" of the mechanical gas, the upper tier B^a constituting, with the oil-supply tank G, the enricher.

The receiving end of the upper tier of pipe-coils constituting with the oil-supply and its connections the enricher has a pipe connection B' with the most distant end tank or carburetor. To the delivery end of the lower tier or layer of pipe-coils of the converter is connected a hot fixed gas-delivery pipe *a'*, which may either pass through the tanks A to heat the oil therein or may pass directly to the condenser J; but I do not claim this method of heating the oil in the tanks, as the oil in said tanks may be maintained at the required temperature by one or more steam or hot-air pipes either singly or combined passing through said tanks in any suitable manner, said pipes for supplying such heating medium entering at one end of the series, as indicated at 5 and having suitable discharge at the other end. This being a well-known expedient I have not thought it necessary to indicate it fully.

G is an oil-tank, suitably disposed and supported in an elevated position and having an air-pressure pipe connecting at *d* with the compressor and a valved pipe connection at

d' with the upper tier B* of pipes to enrich the carbureted air or gas in the latter when desired, the supply of oil for enriching the gas being regulated by the valve.

5 E is an air compressor or pump driven by steam from a suitable boiler (not shown) arranged, preferably, adjacently to and heated by the furnace C. From the steam-chest of the air compressor or pump extends a waste or ex-
10 haust steam pipe H, which, as shown, in Fig. 2, passes through the tanks A to heat the oil therein. The compressor E forces air through a pipe I, connecting therewith, and through a stand-pipe I', connecting with the pipe I and
15 with the end tank or carburetor A nearest to the converter, said pipe I passing through the furnace C. This stand-pipe I' may be charged with charcoal or other purifying agent for the removal of impurities from the air passing through the same. The air in its passage
20 through the pipe I is heated to a temperature sufficient to heat the crude oil and thoroughly carburet the air, the degree of temperature to which said air is heated depending upon the
25 density of the oil, which, varying, also necessitates a corresponding variability of the temperature of the air. I make no claim herein as those skilled in the art will in the use of
30 my apparatus readily know how to regulate the temperature of the air according to the density of the oil employed. From the foregoing it will be seen that the air thus forced into the end tank or carburetor nearest the
35 converter will pass down the pipe D', and in a series of comminuted streams through the small pipes or tubes D² in the bottom of said pipe D' into the oil in said tank, through said oil in said tank to the other end thereof,
40 and from thence to and up the pipe D at the other end of said tank, thence to and down the other leg D' thereof, and through the smaller pipes or tubes D² in the lower end thereof into the next tank, and so on through-
45 out the series of tanks or carburetors, the carbureted air passing out through the most distant tank as mechanical gas, and from thence being conveyed by pipe B' to the converter, where it is enriched and fixed. In such cases
50 where the hot fixed gas, instead of hot air or steam, as preferred by me, is employed to assist in heating the oil in the tanks, said gas may be passed through a pipe a⁴. In this arrangement a⁴ represents a pipe connecting
55 the pipe a³ and the condenser J to permit of the passage of the fixed gas from the converter to the condenser through a pipe a³, connecting the condenser and the scrubber or washer K, from whence it passes through
60 suitable piping to the storage chamber or holder.

The temperature of the tanks may be regulated by any known arrangement of valves controlling the flow of hot air, gas, or steam through pipes passing through the tanks. As
65 before stated, in lieu of passing the hot fixed gas through the tanks, I contemplate passing

the exhaust-steam pipe H and also a hot-air pipe therethrough.

When the fixed gas-pipe is passed through 70 the tanks, I have devised an effectual method of regulating the amount of heat imparted thereby to the tanks. In this arrangement I provide a pipe a¹¹ with a valve a² and also
75 with a pipe connection a⁴ with the hot gas-pipe, which may also have a valve a³. By turning the valve a² the flow of hot gas through the pipe passing through the tanks will be
80 lessened or entirely cut off, so that either a portion or the entire flow of gas may be diverted from the pipe a² and passed through the pipe a⁴.

Although I have shown but one series of tanks or carburetors, it is manifest that two or more of such series may be arranged side
85 by side or the series extended lengthwise, as desired, without departing from my invention, suitable known pipe connection being had between the several series.

Having thus described my invention, what 90 I claim is—

1. An apparatus for making illuminating-gas, consisting of a furnace, a series of oil tanks or carburetors, a series of inverted-U-shaped pipes connecting said tanks at their
95 respective ends, the leg of each pipe connection down which the air or gas passes having at its lower portion a plurality of vertical tubes, a heated-air-supply pipe extended through the furnace and connected with the
100 U-shaped pipe adjacent to said furnace, an oil-supply pipe connecting the tanks, a converter located in the furnace, a suitably-located condenser, and a washer and pipes connecting the last carburetor of the series
105 and the converter and also connecting the converter and the condenser and washer, substantially as and for the purpose set forth.

2. An apparatus for making illuminating-gas, consisting of a furnace, a series of oil tanks or carburetors, a series of inverted-U-shaped pipes connecting said tanks at their
110 respective ends, the leg of each pipe connection down which the air or gas passes having at its lower portion a plurality of vertical tubes, a heated-air-supply pipe extended through the furnace and connected with the
115 U-shaped pipe adjacent to said furnace, an oil-supply pipe connecting the tanks, a converter located in the furnace, an oil-supply pipe connected with said converter for the purpose of supplying oil to and enriching the
120 carbureted air in said converter, a suitably-located condenser, and a washer and pipes connecting the last carburetor of the series
125 and the converter and the condenser and washer, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS H. PAUL.

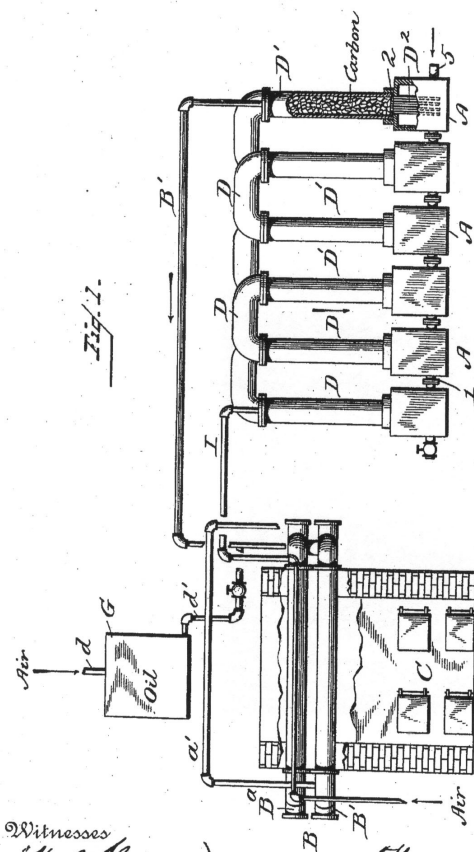
Witnesses:

BENJ. T. WELCH, JR.,
JOSEF K. HAGMANN.

2 Sheets—Sheet 1.

APPARATUS FOR MAKING ILLUMINATING GAS.

Patented Mar. 8, 1892.



Witnesses
 [Signature]
 Albert E. [Signature]

Inventor
Thomas H. Paul
By his Attorney
Chas J. Good

THE MORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

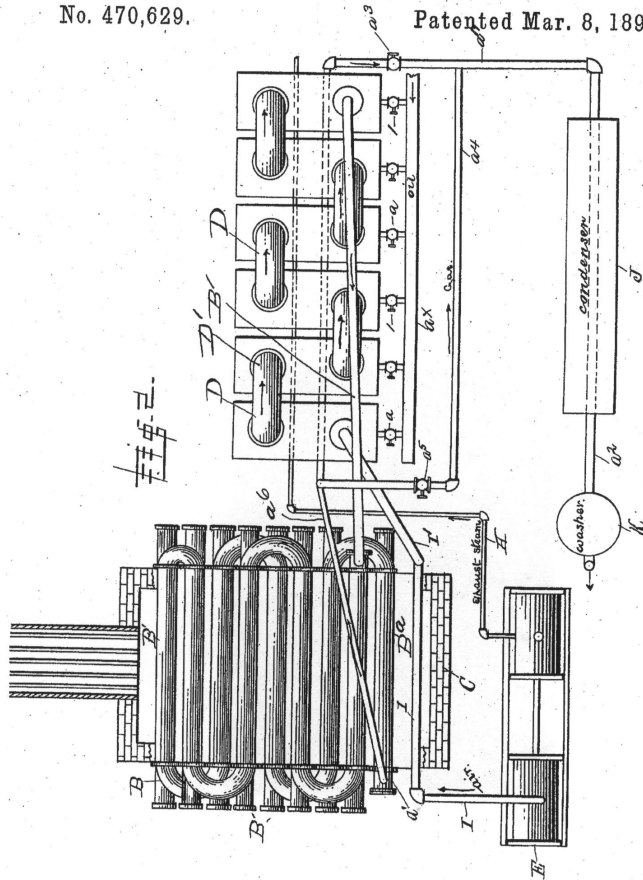
(No Model.)

2 Sheets—Sheet 2.

T. H. PAUL.
APPARATUS FOR MAKING ILLUMINATING GAS.

No. 470,629.

Patented Mar. 8, 1892.



WITNESSES

W. E. Bone
J. H. Hagmann

INVENTOR

Thomas H. Paul
By [Signature] Attorney

UNITED STATES PATENT OFFICE.

THOMAS H. PAUL AND JOHN THOMAS H. PAUL, OF FROSTBURG, MARYLAND.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 530,237, dated December 4, 1894.

Application filed December 12, 1893. Serial No. 493,457. (No model.)

To all whom it may concern:

Be it known that we, THOMAS H. PAUL and JOHN THOMAS H. PAUL, citizens of the United States, residing at Frostburg, in the county of Allegany and State of Maryland, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 It is the object of our invention to provide a gas engine having a simple and effective form of valve mechanism for controlling the same and with reference to the valve mechanism we aim to avoid complication of parts, 15 to render the exhaust quick and certain of action and to operate both the gas and ignition valves from the same rocker mechanism comprising two rocker shafts, operated from eccentrics on the engine shaft.

20 In the drawings:—Figure 1, is a perspective view of the engine. Figs. 2 and 3 are detail views relating to the valve mechanism.

The general form of the engine is the same as is well known. The exhaust valve box is 25 attached at the rear cylinder head and contains the usual form of valve as shown in dotted lines. The stem 1 extends down to connect with the lever 2 carried by the rocker shaft 3 journaled in a bracket 4 at the end of 30 the cylinder. This shaft has a crank arm on its end outside the bracket and this is connected by an eccentric rod 5 with an eccentric 6 on the shaft 8 driven from the crank shaft of the engine by suitable gearing. Not 35 shown. The valve lever 2 is connected with the rocker shaft at the upper surface thereof so that the full effect of the movement is given to the valve and the action thereof is sensitive and quick. The rocker shaft 3, is 40 hollow and through it another shaft 10 extends and this is connected with a second eccentric 11 through a connecting rod 12 and crank arm 13. These two shafts arranged in the peculiar manner shown constitute what 45 may be termed a compound rocker shafting. The second shaft carries the cams 14—15 for operating both the gas inlet valve and the ignition valve. The stem of the gas inlet valve is shown at 16 and the stem of the ignition

valve at 17 and the valve box at 18. A lever 19 50 pivoted in ears 20 on the supporting bracket engages the stem of the gas inlet valve and this lever is operated by a cam 14 on the shaft 10. A similar lever 21 operated by the cam 15 is connected with the stem of the ig- 55 nition valve to operate it and these cams are constructed and arranged to operate the valves in proper order and at proper times. All of these parts are carried at one end of the cylinder, the arrangement being both 60 compact and simple. The same bearing serves for both the shafts and the same brackets supports all the parts. The governor shown at 25 has a bell crank lever 26 pivoted in a bracket or arm 26* the long arm of which 65 extends down and engages the cam of the gas valve so that it will shift the same laterally on its shaft out of line with the cam lever and thus miss the inlet of one charge of gas when the engine runs above a predetermined speed. 70 The governor may be of any approved pattern and that shown is of the ball type. We provide a latch 27 for holding the ignition valve open when the engine is running at full speed. 75

It will be understood that we do not limit ourselves to the precise arrangement of the rocker shafting, that is, one extending through the other as the shafts may be arranged separately and accomplish the same 80 purpose though we prefer the arrangement shown as being the simplest and most effective. The cams on the cam shaft are arranged in reversed position with relation to each other so that as the shaft rocks one way 85 it operates one valve for instance, the gas inlet valve, and when it rocks the other way the other cam acts to open the ignition valve.

We claim—

1. In combination in a gas engine, the gas 90 inlet valve, the ignition valve, the means for operating them and the latch for holding the ignition valve open in ignitable position, substantially as described.

2. In combination in a gas engine, the cyl- 95 inder, the inlet, exhaust and ignition valves, the rocker shafting comprising the two shafts one of which passes through the other, the

arms on said shafts one outside the other, the
eccentric rods connected thereto, the arm on
one of said shafts connected to the exhaust
valve and the two cams on the other shaft re-
versed in position relatively to each other
5 and the levers operated alternately by the
said cams and connected to the inlet and ig-
nition valves, substantially as described.

In testimony whereof we affix our signatures
in presence of two witnesses.

THOMAS H. PAUL.
J. THOMAS H. PAUL.

Witnesses:

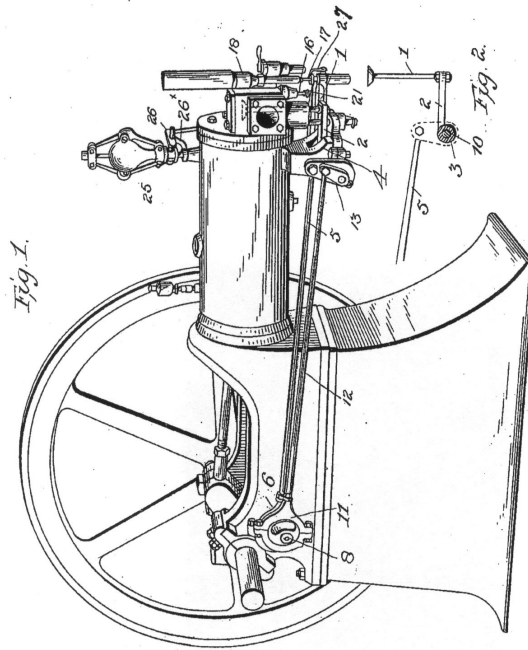
JOHN GOLDSWORTHY,
THOS. G. PORTER.

(No Model.)

T. H. & J. T. H. PAUL.
GAS ENGINE.

No. 530,237.

Patented Dec. 4, 1894.



Attest
James McKim
W. F. Althaus

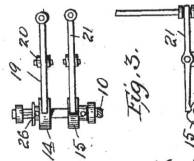


Fig. 3.

Inventors
Thos. H. Paul
J. Thos. H. Paul
by Walter M. M. & Co.
ATTYS.

United States Patent Office.

JAMES ALLAIRE MILLHOLLAND, OF MOUNT SAVAGE, MARYLAND.

Letters Patent No. 111,076, dated January 17, 1871.

IMPROVEMENT IN BRICK-PRESSES.

The Schedule referred to in these Letters Patent and making part of the same.

I, JAMES ALLAIRE MILLHOLLAND, of Mount Savage, county of Alleghany, State of Maryland, have invented an Improved Brick-Press, of which the following is a specification.

Nature and Object of the Invention.

My invention consists of certain improvements in brick-presses, too fully described hereafter to need preliminary explanation, whereby the clay is rapidly and economically molded into bricks of uniform size and density.

Description of the Accompanying Drawing.

Figure 1, sheet 1, is a side elevation of my improved brick-press;

Figure 2, a plan view of the same;

Figure 3, a transverse section on the line 1 2, fig. 2, showing the cam-shaft; and

Figures 4, 5, and 6, sheet 2, are longitudinal sections on the line 3 4, fig. 3, showing the successive operations of the several parts of the machine.

General Description.

The bed-plate or frame A of the machine may be of any suitable form and construction. In the present instance it consists of a single box-like casting, rounded at the corners, and having flanges a and a' at both its upper and lower edges.

To this frame are secured bearings or standards c c, in which turns the driving-shaft B, the latter having at one end a driving-pulley, d, and at its opposite end a toothed pinion, e, which gears into a larger cog-wheel, f, of a cam-shaft, C, which also turns in suitable bearings on the frame of the machine.

The mold-box F is secured to one end of the frame, and has a longitudinal opening or passage, h, extending entirely through it, in which is arranged to slide a solid plunger, G, and with which communicates a vertical opening, i, formed in the lid or cap g of the box.

A transverse metal bar or cross-face, J, is arranged to slide between the outer end of the box F and guides k k, secured to the same, the said cross-face, when at the limit of its upward movement, entirely covering the end of the mold or passage h, while, when at the limit of its downward movement, it forms, with its upper edge, a continuation of the bottom of the said mold, (see fig. 6.)

The plunger G, above referred to, is operated by two cams K and K', placed side by side upon the cam-shaft, and operating alternately upon the faces l and l' of a yoke, M, which is fixed to or forms part

of the plunger-rod M', the latter sliding through and being steadied at its rear end by a guide, m, of the frame.

The cross-face J is hung to and operated by two vibrating rods or levers P P, which are slotted so as to have a limited sliding motion upon their fulcrums n n, at the opposite sides of the mold-box.

These vibrating levers have secured to or are formed at their inner ends into yokes Q Q, which are operated by double cams R R, on the cam-shaft, the portion s of each cam acting upon the faces t t' of its yoke, and the portion s' upon a lug, f', which projects from one side of the bottom of each yoke.

The operation of the machine is as follows:

A roughly-molded brick, or a mass of clay or other material from which a brick is to be made, is dropped through the opening i into the space h, in front of the plunger, when the latter and the several parts of the press are in the position shown in figs. 1 and 4, the cam-shaft turning in the direction indicated by the arrows.

The rounded portion of the cam K first strikes and turns upon the face l of the yoke m, thus gradually moving the plunger forward to the position shown in fig. 5, and compressing the brick between the same and the cross-face J, which is drawn up tightly against the end of the mold-box by the action of the portions s of the double cams R against the rear faces t' of the yokes Q.

After the brick has been thus compressed in the mold, the cam K, although continuing to turn, ceases for an instant to act upon the face l of the yoke, and the plunger remains stationary, the double cams R turning in the meantime to the position shown in fig. 5, and continuing to move until their portions s' have passed over the lugs f' of the yokes.

When this has occurred, the vibrating rods P will, partly owing to the weight of the cross-face J and partly to an upward blow given the yokes by the portions s of the double cams, turn upon their fulcrums to the inclined position shown in fig. 6, or until the cross-face J rests upon the foot o of the mold-box, with its upper edge flush with the bottom of the mold.

As soon as the cross-face has been thus depressed the cam K will again commence to act upon its yoke, and the plunger will be moved forward, as shown in fig. 6, until it has pushed the brick entirely out of the mold and onto the upper edge of the cross-face.

On the motion being continued, the cam K' will strike the rear face t' of the yoke m, and will draw the plunger back to its original position, fig. 4, and

at the same time the cross-face will also be raised and returned to its original position by the action of the portions *s* of the double cams upon the face *t* of the yokes *Q*.

The brick resting upon the top of the cross-face, when thus raised with the same, can either be removed by hand, or may remain upon the cross-piece during another operation of the machine, until it is pushed off by the next succeeding brick onto a traveling table or belt.

The above-described machine, although intended principally for compressing roughly-molded bricks of clay, can, it will be evident, be used for making fire-bricks, and building or other blocks, of any suitable material.

Claims.

1. The vibrating and sliding rods or levers *P*, operating as described, in combination with the cross-face *J* and operating mechanism, as and for the purpose set forth.

2. The yokes *Q Q*, at the inner ends of the said vibrating rods or levers, in combination with the double cams *R R*, for operating upon the yokes, substantially in the manner described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES ALLAIRE MILLHOLLAND.

Witnesses:

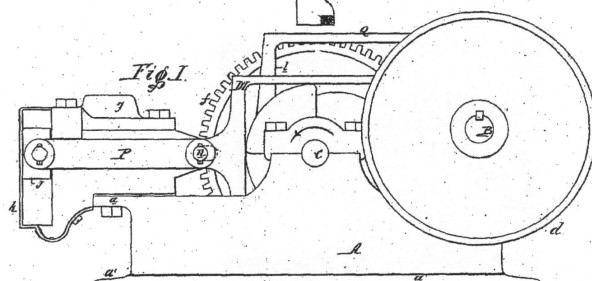
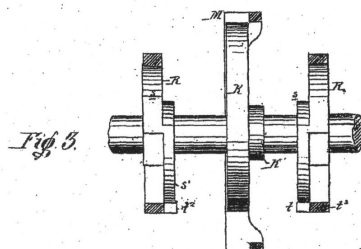
ALONZO B. TURNER,
WM. J. WALKER.

J. A. Willbolland,

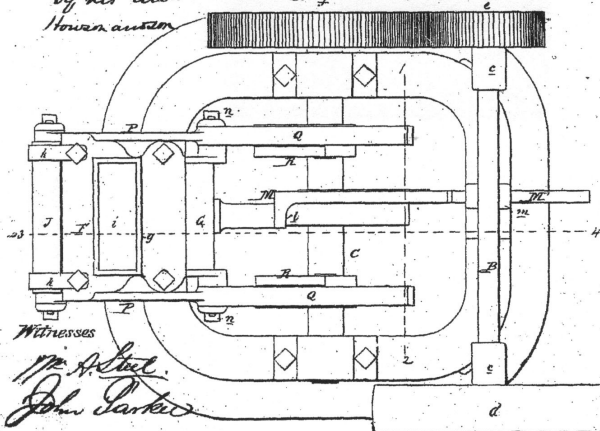
Frick Machine.

No. 111,076

Entered Jan. 17. 1871.

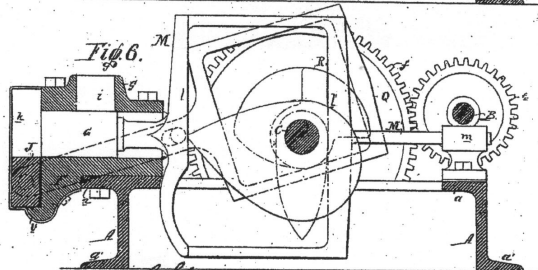
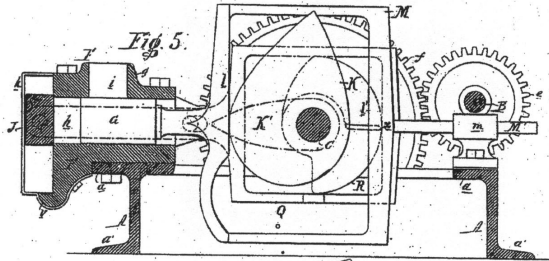
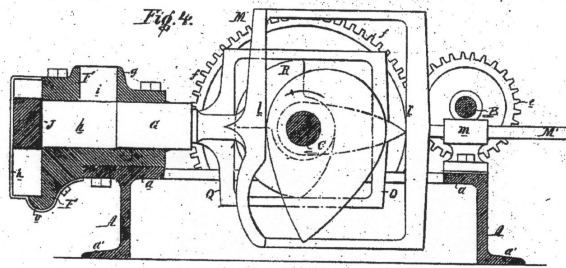


James A. Millholland Fig. 2.
by his attor
Houzon and son



THE NORRIS PETERS CO., WASHINGTON, D. C.

Patented Jan. 17, 1871.



Witnesses { *Wm. H. Steel*
James L. Parker

James A. Millhollan
by his atty. Horace A. Smith

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES A. MILLHOLLAND, OF CUMBERLAND, MARYLAND.

BRAKE FOR COAL-CARS.

SPECIFICATION forming part of Letters Patent No. 255,653, dated March 28, 1882.

Application filed February 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. MILLHOLLAND, a citizen of the United States, and a resident of Cumberland, Alleghany county, Maryland, have invented an Improvement in Brakes for Coal-Cars, &c., of which the following is a specification.

My invention consists of improved braking mechanism for a coal-car in which a body-separated into three compartments is combined with two pairs of axles and four pairs of wheels; and the object of my improvement, which is fully described hereinafter, is increased braking-power by applying brake-shoes to all the wheels instead of to the end wheels only, as in ordinary cars of the class to which my invention relates.

In the accompanying drawings, Figures 1, 2, and 3 are respectively a side view, plan, and end view of a coal-car of the style to which my invention is applied. Fig. 4 is a vertical section, drawn to a larger scale, of part of the car with my improved braking mechanism; Fig. 5, a plan view of Fig. 4, and Fig. 6 a modification of my invention.

The car to which my invention appertains, and which is illustrated on a reduced scale in Figs. 1, 2, and 3, has a body, A, made of sheet-iron in the form shown in Fig. 2, the said body being separated into three compartments by two partitions, a a, each compartment having a funnel-shaped bottom, b, terminating in a circular discharge-opening provided with a door or drop-bottom, d.

The car is provided with four axles and eight wheels, which occupy the position shown in Fig. 1 in relation to the body.

It has been the practice in constructing coal-cars of this class to apply brakes to the two end pairs of wheels only, as indicated at x x, Fig. 1, owing to the difficulty presented by the funnel-shaped bottoms and doors of the three compartments of applying braking mechanism to the inner wheels of the two trucks—a difficulty which I overcome in the following manner, reference being had to Figs. 4 and 5, which illustrate one-half only of the car.

Brake-shoes h h are adapted to the two end

wheels, B, as usual, these shoes being suspended in the ordinary manner from the sill of the car, and being connected to the brake-beam D, which has an arm, f, connected by a chain to the usual windlass or other brake-operating device. Suspended shoes m m are also adapted to the two pairs of intermediate wheels, C C, and these shoes are attached to the ends of the cranked brake-beam G, (best observed in Fig. 5,) which is suspended at its middle by a link, n, to the body of the car, midway between the discharge-openings (indicated by dotted lines in Fig. 5) of two compartments.

The arms p p of the cranked brake-beam are connected by rods w w to arms q q on the brake-beam D, so that on operating the windlass a brake-shoe will be applied to all of the wheels.

The part of the car not shown in Figs. 4 and 5 is provided with precisely similar braking appliances.

It will be seen that the cranked brake-beam G is out of the way of the funnel-shaped bottoms of the compartments of the car-body, and in no way interferes with the doors of the discharge-openings.

The cranked brake-beam may be suspended from two points, as at y y, (see dotted lines, Fig. 5,) in which case the beam may be below the axle and suspended from hangers k k, as shown in Fig. 6.

Although I have described my invention as applied to a coal-car, it will be evident that it can be used with equal advantage on cars for carrying ores or other minerals.

I claim as my invention—

The combination, in a compartment-car, of a cranked brake-beam having shoes adapted to the wheels C C, a brake-beam, D, having shoes adapted to the wheels B B, and connecting devices, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES A. MILLHOLLAND.

Witnesses:

ROBT. SHRIVER,
J. L. GRIFFITH.

(No Model.)

2 Sheets—Sheet 1.

J. A. MILLHOLLAND.
BRAKE FOR COAL CARS

No. 255,653.

Patented Mar. 28, 1882.

Fig. 1.

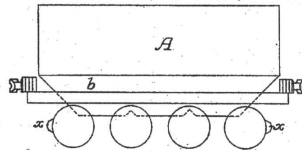


Fig. 2.

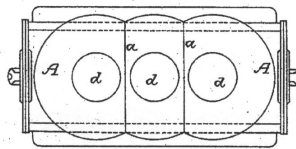


Fig. 3.

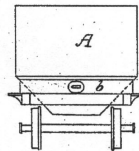
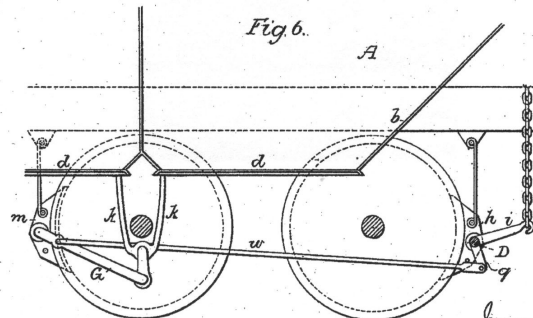


Fig. 6.



Witnesses
Harry Drury
Harry Smith

Inventor
James A. Millholland
by his Attorneys
Haven and Fox

(No Model.)

2 Sheets—Sheet 2.

J. A. MILLHOLLAND.
BRAKE FOR COAL CARS.

No. 255,653.

Patented Mar. 28, 1882.

Fig. 4.

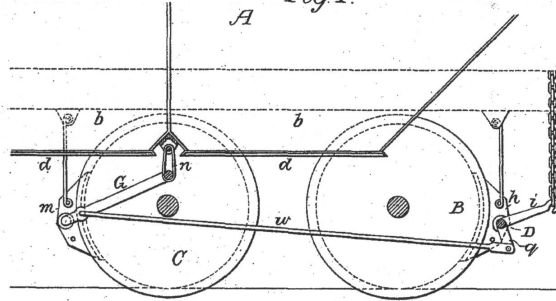
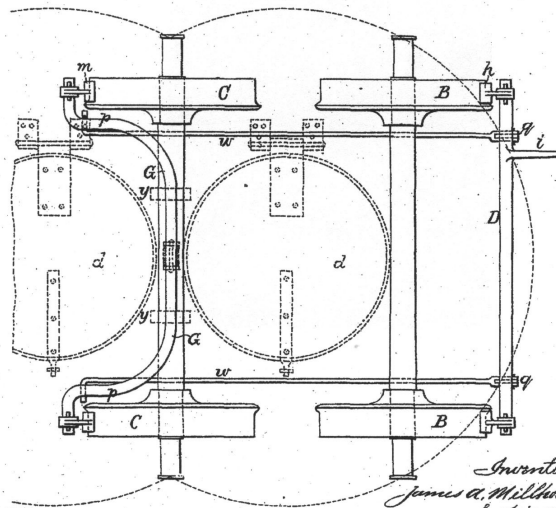


Fig. 5.



Witnesses
Harry Drury
Harry Smith

Inventor:
James A. Millholland
by his attorneys
Howson and Ford

UNITED STATES PATENT OFFICE.

JAMES A. MILLHOLLAND, OF CUMBERLAND, MARYLAND.

AUTOMATIC BLOCK-SIGNAL MECHANISM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 267,561, dated November 14, 1882.

Application filed June 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. MILLHOLLAND, a citizen of the United States, and a resident of Cumberland, Alleghany county, Maryland, have invented certain Improvements in Automatic Block-Signal Mechanism for Railways, of which the following is a specification.

My invention relates to certain improvements in block-signals adapted to be automatically operated by passing trains.

One object of my invention is to insure the setting of a "danger" signal at the commencement of a block on which the train is about to enter before the restoration to the "safety" position of the signal at the commencement of the block which the train is just leaving, a further object being to provide simple mechanism whereby the signals are operated.

In the accompanying drawings, Figure 1 is a diagram illustrating one of the features of the invention; Fig. 2, a plan view of the signal-operating mechanism, and Fig. 3 a longitudinal section of the same.

In the diagram, Fig. 1, x and x' represent two blocks or sections of a railroad-track, and x'' part of a third block, y being the signal controlling the block x , y' the signal controlling the block x' , and y'' the signal for the block x'' , the trains moving in the direction of the arrow. Each signal is connected by a system of rods and levers (described hereinafter) to two pedals, a and a' , located immediately alongside of the track, and adapted to be actuated by one of the wheels of, or by a projection on, a locomotive or car passing over the track, the pedals a being located immediately adjacent to the signals which they operate, but the pedals a' occupying the relation shown to their signals and to the pedals a —that is to say, the pedal a' of the signal y is located just beyond the pedal a of the signal y' , the pedal a' of the signal y' just beyond the pedal a of the signal y'' , and so on. The pedals a of each signal are so connected to each other and to the signal that the depression of the pedal a causes the setting of the signal to indicate "danger," and at the same time effects the elevation of the pedal a' , while the depression of the pedal a' restores the signal to the position indicating "safety," and effects the ele-

vation of the pedal a . Owing to this arrangement, the signal at the commencement of a block which a train is about to enter must be set to indicate "danger" before the signal at the commencement of the block which the train is just leaving is restored to the position indicating "safety." For instance, a train entering the block x' first sets the signal y' to indicate "danger," and then restores to the "safety" position the signal y at the commencement of the block x , and so on.

The mechanism whereby the pedals a and a' are caused to act upon each other and upon the signals is shown in Figs. 2 and 3, in which A represents a plate secured to the ties at one side of the track, and having a lug, b , to which is pivoted one end of the pedal a , the opposite end of the latter being connected to an arm, d , on one end of a rock-shaft, e , adapted to bearings f , the opposite end of the shaft having an arm, g , connected by a rod, h , to an arm, i , on the vertical shaft m , which carries the signal.

In connection with the pedal a' , I use a similar arrangement comprising the plate A' , pivot-lug b' , and rock-shaft e' , with arms d' and g' . The arms d and g are set at right angles on the shaft e , and the arms d' and g' are similarly set on the shaft e' , the arms g and g' being connected by a suitably-supported rod, n , and the arms d and d' being set on their respective shafts, so as to act in opposition to each other, whereby the depression of the pedal a will effect the elevation of the pedal a' , and vice versa, the movement of either pedal being transmitted through the rod h and arm i to the signal-shaft.

A semaphore or any other desired form of signal may be used, that shown being merely selected to illustrate one application of the invention.

I claim as my invention—

1. The combination of each of a series of block-signals on a railway-line with a pair of connected pedals, a and a' , adapted to be operated by passing trains, the pedals of one signal occupying the relation described to those of adjoining signals, whereby the signal at the commencement of the block which the train is entering is set at "danger" before the restoration to

the "safety" position of the signal at the commencement of the block which the train is leaving, as set forth.

2. The combination of the pedals *a a'*, the
5 rock-shafts *e e'*, having arms *d d'* and *g g'* set
in respect to each other as described, and
mechanism for connecting the arms *g g'* together and to the signal, as set forth.

In testimony whereof I have signed my name
to this specification in the presence of two sub- 10
scribing witnesses.

JAMES A. MILLHOLLAND.

Witnesses:

HARRY DRURY,
HARRY SMITH.

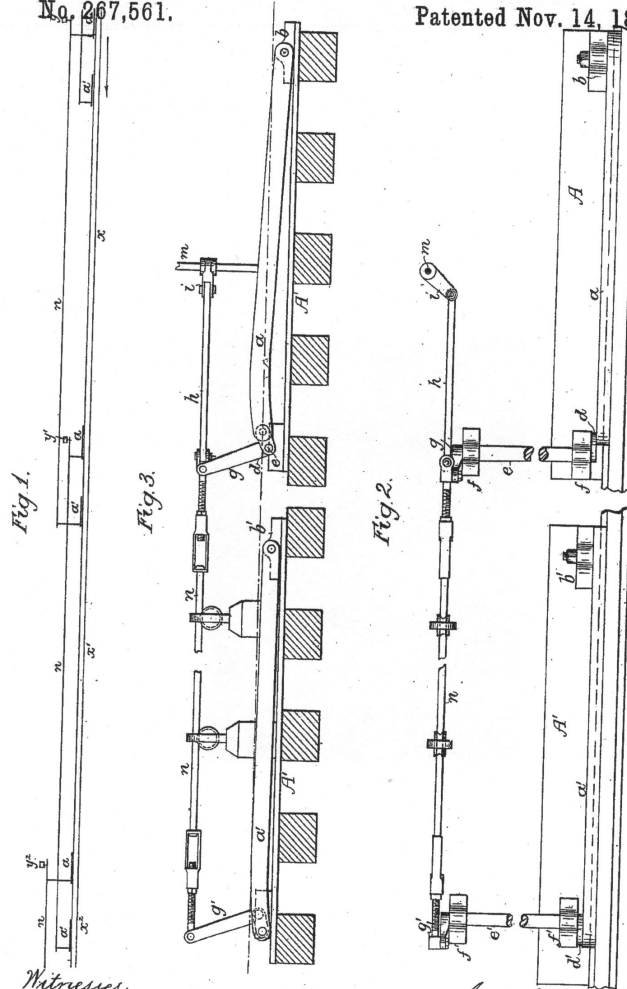
(No Model.)

J. A. MILLHOLLAND.

AUTOMATIC BLOCK SIGNAL MECHANISM FOR RAILWAYS.

No. 267,561.

Patented Nov. 14, 1882.



Witnesses:
Harry R. Rung
James F. Tobin

Inventor
Jas. A. Millholland
by his attorneys
Howison and Ford

H. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JAMES A. MILLHOLLAND, OF CUMBERLAND, MARYLAND.

COAL-CAR.

SPECIFICATION forming part of Letters Patent No. 282,751, dated August 7, 1883.

Application filed April 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. MILLHOLLAND, a citizen of the United States, and a resident of Cumberland, Alleghany county, Maryland, have invented certain Improvements in Coal-Cars, of which the following is a specification.

My invention relates to certain improvements, fully described hereinafter, in that class of coal-cars the sheet-iron bodies of which are separated into different compartments; and the main object of my invention is to increase the capacity of cars of this class, at the same time obtaining an extended wheel-base and adapting the car for being drawn at a higher rate of speed than an ordinary car of this class.

In the accompanying drawings, Figures 1 and 2 are diagrams illustrating, by outline, plan, and elevation, a coal-car made according to my invention; Fig. 3, a side view of one of the trucks, drawn to a larger scale; Fig. 4, a plan view of the truck; Fig. 5, a perspective view of the transverse braces connecting the opposite side frames of the truck together; and Figs. 6 and 7 perspective views, drawn to a still larger scale, and showing a feature of my invention.

I should explain, in the first place, that an ordinary coal-car of the class to which my invention relates, generally known as a "hopper coal-car," consists of three compartments, technically termed "pots," made of sheet-iron and of the form shown in Fig. 1, in which, however, there are four compartments instead of three, the usual number. An ordinary coal-car of this class has no swiveling trucks and no rigid truck-frames, the axles having an endwise movement, intended for the purpose of permitting the wheels to accommodate themselves to curves of the track, an arrangement which does not permit the car to be run at high speeds, or an extension of wheel-base for the purpose of lengthening the car, and thereby increasing its capacity; hence modern cars of this class for increase of capacity have been extended in height, and this resulted in dangerous top-heaviness.

In order to increase the capacity of the compartment-car, I make the body much longer than usual, and separate it into four compartments, as shown in the diagrams Figs. 1 and

2, the body and frame of the car being supported on two four-wheeled trucks, one placed beneath each end compartment, and constructed in the peculiar manner which I will now proceed to describe, reference being had to Figs. 3, 4, 5, 6, and 7.

Each of the opposite side frames, A A, of each truck is composed in the present instance of the upper and lower longitudinal bars, *a a'*, the diagonal braces *b b* and vertical guides *d d* for a sliding block, B, which rests on a spring, D, carried by the frame between the two guides. The axle-boxes *e e* are secured one to each frame, near each end of the same. The opposite frames are connected together by the cross-braces E E', each of which is bent at *w w* and *y y*, so as to clear the usual flanged wheels and permit the free discharge of the contents of the compartment above the truck through the outlet *x*, which is furnished with the usual hinged door. Each cross-brace is preferably made of two bars united at the middle, as shown in Fig. 5, and diverging from the point where they are united in opposite directions to the frames A A', to which they are secured in any suitable manner.

It is not essential to my invention that the precise mode described of constructing the truck should be adhered to; but whatever may be the character of the structure as regards minor details it is necessary that the opposite side frames should be connected together so as to form a rigid truck, and that the connecting-braces should be bent or cranked so as to clear the wheels, and the central opening, *x*, for the discharge of coal in the compartment above the truck, for by this arrangement I am enabled to use a car with a long body on two trucks placed at a suitable distance apart.

As the coal has to be discharged through each truck, a central pivot-bearing is out of the question; hence I have adopted the devices, which I will now proceed to describe, for permitting the car-trucks to swivel to the limited extent necessary, independently of the car-body, when the car is traversing curves in the track.

As seen in Fig. 2, the car-body is secured to a frame, G, the latter, with the body, being suspended by links to the sliding blocks of the trucks. Hangers H are secured to the frame

of the car, two hangers to each longitudinal sill, so that there are two opposite hangers for each truck, one hanger directly above each sliding block, the hanger with the links being
5 best observed in the enlarged perspective views, Figs. 6 and 7. Projections $m m'$ on the block fit loosely between the cheek-pieces $n n'$ of the hanger, and a pin, g , passes through the projections of the block, and carries two links,
10 $p p'$, through the lower end of which, as well as through the cheek-pieces $n n'$ of the hanger and through the block, passes a pin, t , the opening in the block being elongated to permit the free vibration of the links on the pin g . The
15 car body and frame being thus suspended to the sliding blocks of the trucks by the links $p p'$, the said trucks are at liberty to move laterally independently of the body and frame when the car is traversing curves—in other words, the
20 trucks are substantially swiveled. When a truck thus moves independently of the car-body, there will of course be a slight torsion of the links and a slight turning of the blocks B in the hangers; but in making these parts
25 sufficient freedom and looseness are allowed to permit this slight turning.

A coal-car may be made according to my invention in which a body is separated into five compartments; but a car containing twenty-
30 five tons, and having a body separated into four compartments, with a truck directly beneath each compartment, as described above, is the best, as there is the desired extension of wheel-base, while the body of the car can be
35 made to hold twenty-five tons of coal, the center of gravity of the load being maintained in a safe relation to the truck. The present coal-car, with its three compartments, will not carry more than fifteen tons, and not this without

carrying the load to such a height as to make 40 the car top-heavy.

I claim as my invention—

1. The combination, in a coal-car, of a body separated into four or five compartments, each of which has a discharge-opening, with two 45 trucks, one situated beneath each end compartment, each truck having a rigid frame loosely connected to the frame of the car, so as to turn independently of the same, and constructed to permit the free discharge of the coal 50 from the discharge-opening, all substantially as set forth.

2. A car-truck in which the opposite side frames, $A A$, carrying the axle-boxes, and outside the wheels, are combined with and con- 55 nected together by cranked transverse braces $E E$, substantially as set forth.

3. The combination of a car-truck composed of opposite side frames and cranked connecting-braces, with a car-body, one compartment 60 of which, having a central outlet, is situated directly above the truck, substantially as set forth.

4. The combination of two trucks, each having opposite side frames connected together 65 by cranked transverse braces, and provided with sliding blocks B and springs D , with a car body and frame and links whereby the said body and frame are suspended to the sliding block, substantially as specified. 70

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES A. MILLHOLLAND.

Witnesses:

HARRY DEURY,
HENRY HOWSON, Jr.

(No. Model.)

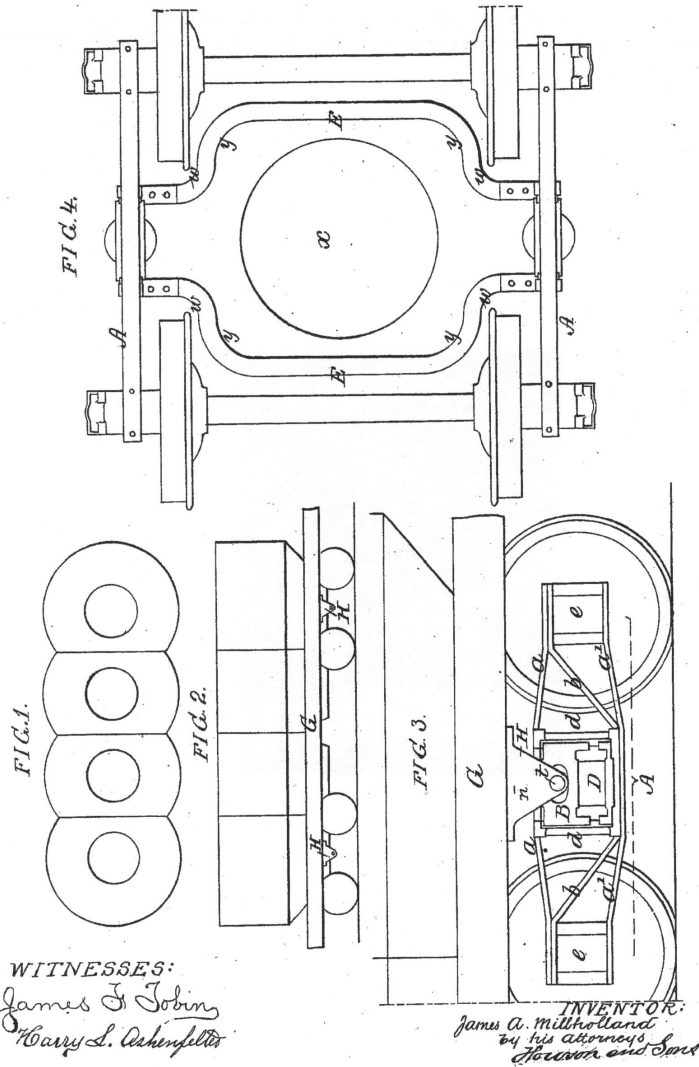
2 Sheets—Sheet 1.

J. A. MILLHOLLAND.

COAL CAR.

No. 282,751.

Patented Aug. 7, 1883.



WITNESSES:

James J. Tobin
Harry L. Ashenfelter

INVENTOR:
James A. Millholland
by his attorneys
Hewitt and Sons

H. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

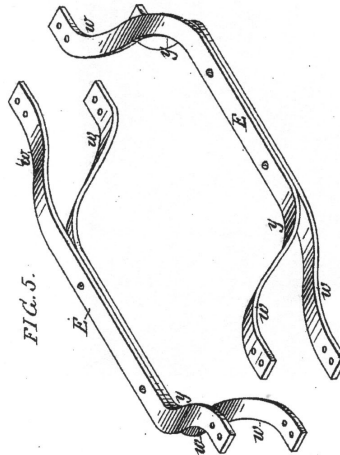
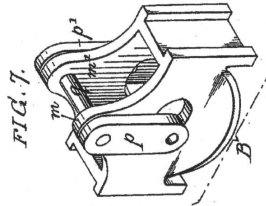
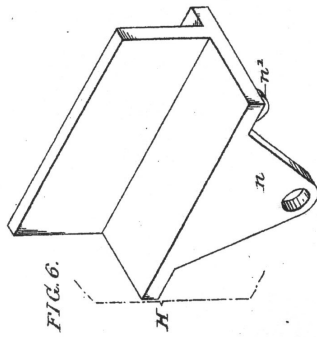
2 Sheets—Sheet 2.

J. A. MILLHOLLAND.

COAL CAR.

No. 282,751.

Patented Aug. 7, 1883.



WITNESSES:

James J. Tobin
Harry L. Ashenfelter

INVENTOR:

James A. Millholland
by his Attorneys.
Hawm and Jones

H. PETERS, Photo-Lithographer, Washington, D. C.